Environmental Community Letter

Lawrence Livermore National Laboratory

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WHAT IS A SITE ANNUAL ENVIRONMENTAL REPORT, OR SAER, AND HOW DO I GET ONE?

Each year Lawrence Livermore Laboratory is required to make hundreds of different reports for its regulators. Regulators are those agencies charged with protecting public health and the environment, such as the U.S. Environmental Protection Agency, regional air and water boards, and the California Department of Toxic Substances Control.

These agencies, as well as the Department of Energy and the University of California, which manages the Laboratory for the U.S. Department of Energy, oversee Lab operations and monitor any impacts that LLNL operations may have on the public or the environment.

The Lab also does environmental studies that are not required by regulatory agencies. All studies are done to the appropriate scientific, technical, and/or regulatory standards.

The information for the Lab's 1997 SAER summarizes the Laboratory's compliance status and the emissions that occurred during the year. In addition, the Lab collects over 24,000 environmental monitoring samples during the year from all media and assesses over 260,000 analytes from these samples. Each individual sample may be analyzed for many different characteristics. For example, some ground water samples may be tested to determine as many as 19 different results; others may only be tested for one.

All the data collected, collated, and reviewed, and the related modeling, analysis, and conclusions, are presented annually not only to regulatory agencies, but are also shared with the public through the SAER.

You will find volumes of the 1997 Site Annual Environmental Report in local repositories. The repositories are located at the Livermore and Tracy libraries, as well as at the LLNL Visitors Center.

The documents are also available on the Web at http://www.llnl.gov/saer.

This letter features an abbreviated version of the 1997 SAER's Executive Summary. The complete document is available by calling Bert Heffner at (925) 424-4026.

1997 ENVIRONMENTAL REPORT SHOWS LITTLE IMPACT OF LLNL OPERATIONS ON PUBLIC OR ENVIRONMENT

The Executive Summary in the 1997 SAER concludes that radiological doses to the public caused by LLNL operations are less than 1.0% of regulatory standards. This is about 3000 times smaller than the dose from background radiation received by U.S. citizens, on average.

The analytical results and evaluations generally show continuing low contaminant levels. This reflects both decreased operations at the Laboratory and its increasing control of pollutants.

Environmental compliance activities in 1997 showed significant achievements:

- Livermore ground water remediation activities have stopped the westward migration of contaminant plumes offsite.
- Waste minimization efforts have significantly reduced the amount of waste generated in Lab operations.
- Recycling efforts have almost cut in half the quantity of waste sent to landfills.
- Waste reduction and pollution prevention activities made major strides to reduce or eliminate, recover or recycle potential pollutants. LLNL has earned a number of national and regional awards for these efforts.

In summary, the 1997 Site Annual Environmental Report documents that environmental impacts of LLNL operations are minimal and pose no threat to the public health or the environment.

SPECIFIC MONITORING ACTIVITIES

Air monitored for plutonium, tritium, and other radionuclides

Air is monitored at various locations on the Livermore site, throughout the Livermore Valley, onsite at Site 300, and in the Tracy area. Concentrations of all monitored radionuclides and beryllium at all locations were well below levels that would endanger the environment or public health.

For example, the concentration of plutonium on offsite air filter samples was 0.0014% of the federal standard. Median concentrations of tritium in the same locations were 0.002% of the federal standard. Similar results were found offsite at Site 300.

The federal standards and guidelines for radionuclides are highly protective of the public. Standards limit the annual dose to a public individual, and guidelines specify the concentration of radionuclides that could be inhaled or ingested continuously for 365 days a year without exceeding the radioactive protection standard for the public. LLNL has never come close to exceeding the federal standards.

Effluent monitoring for tritium and radioactive particulates

At the beginning of 1997, nine buildings at the Livermore site were monitored for the release of effluent air from operations. The number dropped to six buildings by the end of the year as operations changed. Radionuclide emissions from all monitored facilities remain low.

Emissions of nonradioactive hazardous and toxic air pollutants in Laboratory operations are quite small and typical of values in past years. For example, total nitrogen oxide emission from the Livermore site was about 59 kilograms per day. This is about one ten thousandth of the daily releases of this pollutant from all sources in the Bay Area.

The numbers for reactive organics are 37 kilograms a day, far less than one ten thousandth of the total Bay Area emission for that pollutant.

The total emission of criteria air pollutants is approximately 100 kilograms a day for the Livermore site and about 25 times smaller for Site 300. Both are also very small releases compared to the entire Bay Area. Criteria air pollutants include nitrous oxide, sulfur oxides, particulate matter, carbon dioxide, and lead.

Waste water monitoring for radioactive and other hazardous materials

The Livermore site discharged almost a million liters a day of waste water to the City of Livermore sewer system. That was 4.4% of the total flow to the system. Sandia National Laboratories/California generates about one-fifth of that flow from the Livermore site to the City system.

The sewage flow from LLNL to the Livermore Water Reclamation Plant is monitored continuously. The monitoring can activate an LLNL sewer diversion system to prevent large releases to the Livermore Water Reclamation Plant (LWRP).

No LLNL sewer releases in 1997 exceeded the City's discharge limits for radioactive materials.

LLNL achieved greater than 99% compliance with LWRP permit limits. There were five notices of violation in 1997. Most were for pH exceedances(acid/alkali balance); one involved excess silver, another mercury, and two others were for lead exceedances.

Water monitoring for radionuclides and other contaminants

The 1997 maximum tritium activities measured in surface and drinking water were 3% of the regulatory maximum contaminant level(MCL). No sample was above the MCL. Gross alpha and gross beta radioactivity measurements were also far below regulatory levels of concern.

Fish placed in Livermore storm water runoff for 96 hours showed a 100% survival rate. This required test indicated that storm water runoff from LLNL has no adverse impact on offsite biological life.

Wells on the Livermore site and Site 300 produced samples demonstrating that most historic Lab-related contaminants are at or below regulatory levels.

There are no offsite wells showing contaminants from Laboratory operations other than the volatile organic compounds (VOCs) at the Livermore Site presently being remediated.

Soil and sediment monitored for plutonium and other radionuclides

Most of the analyses of 1997 offsite soil and sediment samples of constituents of concern simply could not detect contaminants. Other analyses showed trace amounts, or naturally occurring or background levels.

Onsite 1997 sample analysis showed similar results with few exceptions. Elevated concentrations of depleted uranium were found near two Site 300 firing tables.

Samples taken in earlier years have documented plutonium levels above background, but below regulatory levels of concern, on the Livermore site and at a few offsite locations.

In 1995 an elevated concentration of plutonium was confirmed in one location in Livermore's Big Trees Park, and samples from two other locations are considered to be slightly elevated. All findings are well below regulatory levels of concern.

Analysis of samples from Big Trees Park taken early in 1998 should be completed this calendar year.The results will be shared with the public as soon as regulatory agencies complete their review.

Vegetation and foodstuff monitoring for tritium

The highest detected value for tritium found in one sample of area vegetation and foodstuff was 1.1% of the amount California allows in drinking water. In general, monitoring showed values not significantly different from past years.

As usual, there was slightly more tritium near the Livermore site than was found at more distant locations. Potential ingestion dose estimates were well below levels of regulatory concern, even when organically bound tritium was taken into account.

Radiological dose assessment

The 1997 Livermore site dose assessment produced almost the same values as last year's.

A hypothetical member of the public having the greatest possible exposure to Livermore site operations would have received less than one-tenth of a millirem of radiation.

The average annual exposure for the public from all sources in daily life (medical, dental, radon gas, cosmic radiation, etc.) is 350 millirem.

Therefore the Laboratory contributes about 1/3000th of the estimated dose individuals receive in the radioactive environment in which we live. Most of the radiation comes from natural sources such as the sun and the earth.

A member of the public must stand at the LLNL fence line all day, every day for a year, to receive the maximum one-tenth-millirem dose quoted above.

The dose estimate for a hypothetical public individual living for a year at the fence line of Site 300 was the lowest since these estimates were first made eight years ago. The estimate was for 0.02 millirem, representing 61% of last year's estimate.

Ground Water Remediation

In 1997, seven treatment facilities at the Livermore site processed over 870 million liters of ground water. Nearly 110 kilograms of volatile organic compounds (VOCs) were removed during treatment.

More than 6 kilograms of VOCs were removed in four treatment areas at Site 300. These efforts reduced trichlorethene in one area, for example, from 9400 parts per billion in 1993 to 380 ppb in 1997.

Waste Minimization and Pollution Prevention

Waste generation at LLNL has dropped dramatically over the past eight years. There have been reductions in all four categories: radioactive, mixed, hazardous, and sanitary. These categories show reductions of 85%, 90%, 87%, and 28%, respectively.

Total LLNL waste diverted from landfills in 1997 was 40,000 tons. This is almost ten times the total diverted two years ago. Over 90% of nonhazardous waste was recycled.

1998 GROUND WATER CLEANUP PROGRESS

LIVERMORE SITE

Ground water investigation and remediation at the Livermore site continues to show marked progress. From 1988 through September of this year, more than 752,020,000 gallons of ground water were treated. Treatment removed 316 kilograms of volatile organic compounds (VOCs) to concentrations well within limits for discharge to the environment.

Significant progress was made in reducing the length and strength of the offsite plume to the west under Vasco Road near East Avenue. The plume is about 100 feet underground, below the street and an empty lot. No humans can contact the plume or use it for drinking water.

More than 9,594,000 cubic feet of soil vapor were also successfully treated through September 1998. The treatment removed 121 kilograms of VOCs to concentrations permitted to be discharged to the atmosphere.

Key to accomplishments were the operation of 5 major ground water and soil vapor treatment facilities. In addition, 9 portable treatment facilities and three other special treatment facilities were operated in the past year. This is in addition to the 445 ground water monitoring wells, 124 piezometers and 270 investigatory boreholes providing information for the "smart pump & treat" remediation activities. "Smart pump and treat" uses computerized information to direct pumping activities to enhance plume collapse.

Since 1988, the Department of Energy has invested over $11.2 million on average per year for the Livermore site. The results of this investment are detailed in almost 20 major documents plus annual, quarterly and monthly reports. All reports are available to the public in our repositories, through the web or directly. Also each year's work is summarized in the Site Annual Environmental Report.

SITE 300

Site 300 is preparing plans for overall site-wide cleanup, but some remediation has already begun in specific areas. Public meetings or workshops were held for

each remediation activity now underway as they will be for future activities.

Over the last three years over 55,654,000 gallons of ground water have been treated to levels well below allowable discharge limits. This treatment removed about 22 kilograms of VOC mass. In the same period, approximately 15,237,000 cubic feet of soil vapor were treated, removing about 13 kilograms of VOCs.

Since 1988, the Department of Energy has invested an average of $7.1 million a year primarily in assessing restoration needs of Site 300. Effort is expected to shift to more extensive remediation activities in the future as more major, portable and special treatment facilities and innovative technologies are brought on-line.

Both the Livermore Site and Site 300 receive citizen input on remediation activities as well as regulatory oversight by the U.S. Environmental Protection Agency (EPA), California Department of Toxic Substances Control and the Regional Water Quality Control Board.

The Livermore Site has a Community Work Group (CWG) and a Technical Assistance Grant (TAG) from EPA has been given to Tri Valley Citizens Against a Radioactive Environment (TVC).

Site 300 has a Community Review Panel (CRP) and TVC has also been given an EPA TAG grant. TAG grants pay for the review and discussion of remediation activities.

Both the CWG and the CRP are voluntary efforts by LLNL to secure input from the community on its cleanup activities at the Livermore site and Site 300.

LESS BANG FOR THE PUBLIC MEANS MORE FOR THE BUCK AT SITE 300

A unique facility to be built at Site 300 over the next few years will reduce the noise our neighbors hear from explosions. It will also allow Site 300 to do explosive tests around the clock, in any kind of weather. And it will reduce the impact on the environment from those tests.

Think of it as putting the bang in a box. A very big, strong, almost sound-proof box. A box that can be cleaned after explosive tests and trap the resulting waste for appropriate treatment and/or disposal. Other explosive tests will continue outdoors and small quantities of waste explosives will still require open-air detonation.

The facility is called the Contained Firing Facility(CFF). It will help Site 300 achieve its major mission to assure the non-nuclear high explosive components of U.S. nuclear weapons are safe and reliable.

The CCF's firing chamber is a unique 50-foot-square, 30-foot-high, heavily reinforced concrete structure placed atop an existing firing table. This is done to access the sophisticated equipment that has been developed and installed over the years for measuring what happens during explosions. Much of the equipment is one-of a-kind and built into a protected bunker to avoid destruction.

The five and one-half foot thick walls of the firing chamber are lined with up to two inches of steel. The lining can stop shrapnel traveling over 2800 mph. The CFF is designed to contain the sound and explosive force of over 200 pounds of TNT. The facility will flex in response to the explosive force during a test.

The operational limit for the CFF will be 132 pounds of energetic high explosives. This is one of the world's largest operational explosive weight limits for a containment structure. Or the biggest bang you can find in a box anywhere in the world. And it will make a bit quieter neighborhood since Site 300 started operation almost 45 years ago.

CONTINUATION OF WORK SMART STANDARDS PROCESS AT LLNL

Work Smart Standards (WSS) is an integral part of the Integrated Safety Management System LLNL is presently implementing. DOE OAK and LLNL are continuing the WSS process as defined in DOE Manual 450.3-1, "The Department of Energy Closure Process for Necessary and Sufficient Sets of Standards" to identify an institutional set of ES&H work smart standards. The standards set shall contain all appropriate DOE Orders, applicable federal, state and local laws and regulations, as well as those additional standards that provide the adequate level of protection to the worker, the public and the environment.

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